

## WHAT IS CLAIMED IS:

1. An installation device for a piston ring, comprising:  
an extruding mechanism that horizontally extrudes a piston  
5 ring occupying a lowest position among piston rings held and  
stacked up and then positions the extruded piston ring at a  
predetermined position, the extruding mechanism being driven  
downwardly in a vertical direction by a predetermined amount  
after extruding the piston ring and then driven to return to  
10 a waiting position;

a ring holding mechanism that has a guide passage used  
to guide the piston ring extruded by the extruding mechanism  
while holding the piston ring in such a way as to sandwich the  
piston ring from upward and downward directions, the ring holding  
15 mechanism being driven so as to move close to and apart from  
a piston in one direction intersecting with an extruding  
direction, and being capable of defining an insertion hole into  
which the piston is inserted in a center area thereof;

a ring diameter extending mechanism that extends a diameter  
20 of the piston ring held by the ring holding mechanism while being  
in contact with an inner surface of the piston ring, the ring  
diameter extending mechanism being driven to freely enter and  
leave the guide passage defined by the ring holding mechanism,  
and being driven to recede toward a position defining a part  
25 of the guide passage when an extended state of the piston ring  
is released; and

a piston holding member that holds the piston inserted

into the insertion hole at a predetermined position.

2. The installation device for a piston ring according to claim 1, wherein the extruding mechanism includes:

5 a push-out member that pushes out a piston ring occupying a lowest position among piston rings stacked up;

a horizontally driving mechanism that drives reciprocatively the push-out member in a horizontal direction; and

10 a vertically driving mechanism that drives reciprocatively the push-out member in a vertical direction.

3. The installation device for a piston ring according to claim 2, wherein the push-out member has a groove that is  
15 formed in an upper surface of a forward end thereof to receive a piston ring.

4. The installation device for a piston ring according to claim 1, wherein the ring holding mechanism includes:

20 a pair of guide plates that are disposed to face each other in a direction perpendicular to the extruding direction in which a piston ring is extruded and that have guide surfaces, respectively, defining substantially semicircle inside edge parts at end surfaces facing each other and defining the guide  
25 passage while facing each other in upward and downward directions with a predetermined interval therebetween; and

a first driving mechanism that drives the pair of guide

plates so as to move close to each other and apart from each other in one direction.

5        5.        The installation device for a piston ring according to claim 4, wherein each of the pair of guide plates includes:

an upper plate that forms an upper guide surface serving as a part of the guide passage and an upper inside edge part serving as a part of the insertion hole; and

10        a lower plate that forms a lower guide surface serving as a part of the guide passage and a lower inside edge part greater in radius of curvature than the upper inside edge part, and

the ring diameter extending mechanism includes:

15        a pair of diameter extending members that are capable of coming into contact with the upper guide surfaces of the upper plates, that are disposed adjacent to the lower edge parts of the lower plates so as to serve as a part of the insertion hole while being flush with the upper inside edge parts, that are supported so as to be movable in a direction in which the pair of guide plates are moved close to and apart from each other, 20 and that are supported so as to be able to protrude and retreat from the lower guide surface;

a second driving mechanism that drives the pair of diameter extending members so as to move close to and apart from each other; and

25        a third driving mechanism that drives the pair of diameter extending members so as to protrude and retreat from the guide surface in a direction perpendicular to the guide surface.

6. The installation device for a piston ring according to claim 5, wherein the second driving mechanism is also used as the first driving mechanism.

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7. The installation device for a piston ring according to claim 1, wherein the pair of diameter extending members include upper end parts that are formed to be engaged with the upper plates and that define slanting surfaces used to guide a piston ring toward a ring groove.

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8. An installation method for a piston ring, comprising:  
an extruding step of extruding a lowest piston ring, occupying a lowest position among piston rings held and stacked up, by means of a push-out member along a guide passage toward a predetermined position in a horizontal direction and pre-moving the push-out member downwardly in a vertical direction by a predetermined amount when the push-out member is returned to a waiting position;

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a ring diameter extending step of, following the extruding step, extending a diameter of the piston ring held in such a way as to be sandwiched from upward and downward directions by means of a diameter extending member;

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a piston positioning step of, following the ring diameter extending step, positioning a ring groove of a piston at a predetermined position; and

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a ring inserting step of, following the piston positioning

step, allowing the diameter extending member to recede from the guide passage so as to release an extended state of the piston ring and inserting the piston ring into the ring groove while maintaining the surrounded guide passage.

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